TECHNOLOGY NEEDS/OPPORTUNITIES STATEMENT

ABILITY TO NDA LARGE BURIAL BOXES AND LONG PIPE SECTIONS WITH LOW PLUTONIUM CONCENTRATIONS

Identification No.: RL-01-016-NM
Date: September 2000

Program: Nuclear Materials Stabilization
OPS Office/Site: Richland Operations Office/Hanford Site
PBS No.: RL-CP03
Waste Stream: TRU Solid Waste/Low Level Solid Waste
TSD Title: N/A
Operable Unit (if applicable): N/A
Waste Management Unit (if applicable): N/A
Facility: Plutonium Finishing Plant

Priority Rating:

This entry addresses the "Accelerated Cleanup: Paths to Closure (ACPC)" Priority:

____ 1. Critical to the success of the ACPC
_X_ 2. Provides substantial benefit to ACPC projects (e.g., moderate to high lifecycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays)
____ 3. Provides opportunities for significant, but lower cost savings or risk reduction, and may reduce uncertainty in ACPC project success.

Need Title: Ability to NDA Large Burial Boxes and Long Pipe Sections with Low Plutonium Concentrations

Need/Opportunity Category: *Technology Opportunity*

Need Description:

- Description: Large burial boxes containing low level and TRU waste are produced during the stabilization and disposal activities at the PFP. Terminal cleanout and D&D activities will produce pipe and ducting sections that must be disposed of. Accurate accountability for the transuranic contents in the burial boxes and pipe sections is difficult and can force conservative estimates to be used, resulting in inefficient and expensive use of the available burial box volume. Segregation of low level and TRU wastes is also a major issue, as the cost of disposal differs by almost an order of magnitude.

- Background: The activities at the PFP over the next few years are focused on stabilization and disposition, followed by a number of years of D&D activity to take the facility to a "slab on grade" status. Large amounts of low level and TRU waste containers will be produced during these activities. Any technologies that improve accountability and segregation of low level and TRU wastes can be used not only during the stabilization and disposal tasks over the next 5 years, but also in future waste handling during decontamination and decommissioning at the PFP. In addition, these technologies would also have broad applications in the waste management programs at other DOE Sites.

Schedule Requirements: This technology is needed as soon as possible to attain the maximum benefit, but can contribute to cost savings and potential schedule acceleration anytime before FY 2010.

Earliest Date Required: 09/2000
Latest Date Required: FY 2005 or beyond

Problem Description: Current NDA counting of large burial boxes and long pipe sections to determine the transuranic contents is difficult and not accurate enough to provide good segregation between low level and TRU wastes.

Potential Life-Cycle Cost Savings of Need (in $000s) and Cost Savings Explanation: Assuming that there are approximately 10 burial boxes per year produced during stabilization tasks for 5 years, and 30 per year for 5 years during terminal cleanout and D&D, and that piping and ductwork demolition add an equivalent 30 boxes during D&D, there are 350 boxes to dispose. If approximately half could be determined to be low level waste rather than TRU, and the savings estimated to be about $15,000 per box, the total cost avoidance is $2.6 million at a rough order of magnitude.

Benefit to the Project Baseline of Filling Need: The disposition of significant amounts of waste in large burial boxes will be required to achieve the facility mission of terminal cleanout and D&D to a slab on grade status. Effective partitioning of the waste into low level and TRU portions will result in significant cost savings, and provide better safeguards accountability of TRU disposition. Also, current TRU burial box shipments are done primarily based on conservative estimates and calculated total plutonium content; more accurate values are desired by the Central Waste Complex for validation of TRU contents.

Relevant PBS Milestone: TRP-14-401, Complete PFP Deactivation, 9/30/16.

Functional Performance Requirements: Technology to provide NDA measurements of transuranic waste in large burial boxes or pipe sections must meet requirements for accuracy and precision that can determine whether the disposal limits for low level waste versus TRU waste are met. The method must be effective for a variety of waste packages, including the currently used TRU burial box.

Work Breakdown Structure (WBS) No.: ***TIP No.:***

1.04.05.01.15 N/A

Justification For Need:

Technical: There is no current accurate method to segregate large burial boxes between low level and TRU waste categories.

Regulatory: National standards for TRU versus low level waste contents (DOE 0 435.1).

Environmental Safety & Health: Accurate accountability assures that disposal of the wastes is appropriate for the hazards associated with the transuranic contents.

Cultural/Stakeholder Concerns: None.

Other: N/A

Current Baseline Technology: The current method consists tracking material placed into containers for the burial boxes, with conservative estimates in most cases of plutonium contents, and a calculated value for total transuranic mass content. The items placed into burial boxes, generally, have been counted using portable NDA equipment, but the accuracy is low and again conservative values are assigned to assure that criticality and disposal requirements are met. Pipe sections are counted, also, with the same portable NDA measurement equipment.

End-User: Fluor Hanford, Inc., Nuclear Materials Stabilization Project

Contractor Facility/Project Manager: George W. Jackson, Director, Nuclear Materials Stabilization Project, Fluor Hanford, Inc. 509-373-6622

Site Technical Points-of-Contact: M. W. Gibson, Fluor Hanford, Inc. (FH), (509) 373-4869, Fax (509) 372-0232, email mark_w_Gibson@rl.gov

DOE End-User/Representative Point-of-Contact: A. K. Wright, DOE-RL Material Disposition Division (509) 373-7303, Fax (509) 376-0695, allison_k_wright@rl.gov